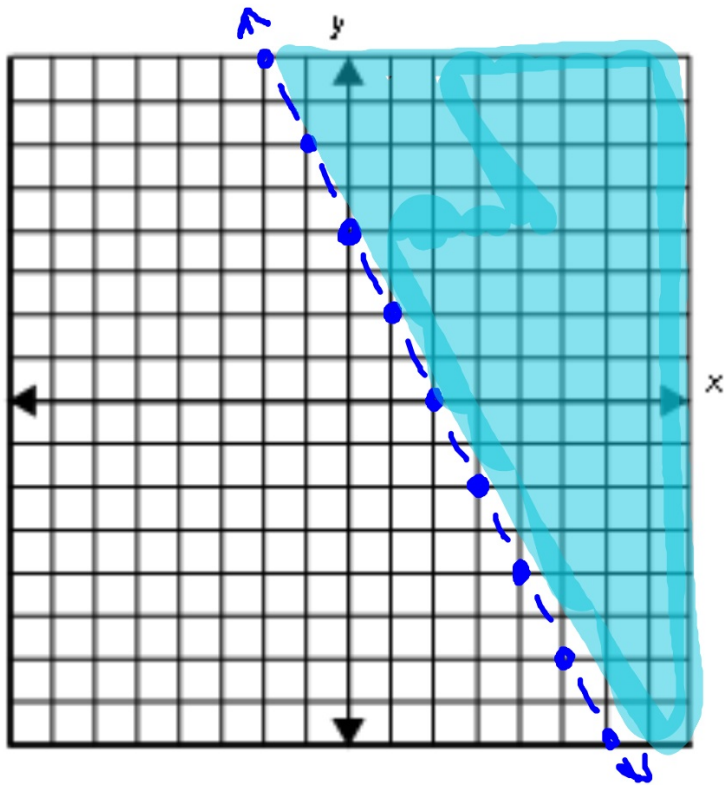


Warm Up: 10/16/12

Write an inequality for the graph below.

$$y > -2x + 4$$



Section 1.6:

Solving Absolute Value Equations and Inequalities

Definition of Absolute Value:

distance away from zero
(always positive)

What does that mean when solving an equation?

normally will have 2 answers.

example 1:

$$|2x-1|=5$$

$$\begin{array}{r} 2x-1 = 5 \\ +1 \quad +1 \\ \hline \end{array}$$

$$2x = 6$$

$$\boxed{x=3}$$

$$\begin{array}{r} 2x-1 = -5 \\ +1 \quad +1 \\ \hline \end{array}$$

$$2x = -4$$

$$\boxed{x=-2}$$

example 2:

$$\begin{array}{r} 3|x+2| - 1 = 8 \\ \hline 3|x+2| = 9 \\ \hline |x+2| = 3 \end{array}$$

$$\begin{array}{l} \swarrow \searrow \\ \begin{array}{r} x+2 = 3 \\ -2 \quad -2 \\ \hline x = 1 \end{array} \quad \begin{array}{r} x+2 = -3 \\ -2 \quad -2 \\ \hline x = -5 \end{array} \end{array}$$

★ before you write two equations, you must isolate the absolute value.

$$4|2x+6|-3=13$$

$$+3=16$$

$$\frac{4}{4}|2x+6|=\frac{16}{4}$$

$$|2x+6|=4$$

$$2x+6=4$$

$$\begin{array}{r} 2x+6=4 \\ -6 \quad -6 \\ \hline 2x=-2 \end{array}$$

$$\frac{2x}{2} = \frac{-2}{2} \quad \boxed{x=-1}$$

$$\begin{array}{r} 2x+6=-4 \\ -6 \quad -6 \\ \hline 2x=-10 \\ \frac{2x}{2} = \frac{-10}{2} \\ \hline \boxed{x=-5} \end{array}$$

example 3:

$$\frac{-3|x+4|}{-3} = \frac{9}{-3}$$

$$|x+4| = -3$$

abs. value $\neq \ominus$

no solution

$$\begin{array}{r} x+4 = -3 \\ x+4 = -4 \\ \hline x = -7 \end{array}$$

$$\begin{array}{r} x+4 = 3 \\ x+4 = -4 \\ \hline x = -1 \end{array}$$

* can only
write 2 equations
if absolute value
= a positive number.
If = a negative number,
there is no solution.

Solve each inequality. Answer in Interval Notation.

example 4:

$$|2x-1| < 5$$

$$\begin{array}{r} 2x-1 < 5 \\ +1 \quad +1 \\ \hline \end{array}$$

$$2x < 6$$

$$x < 3$$

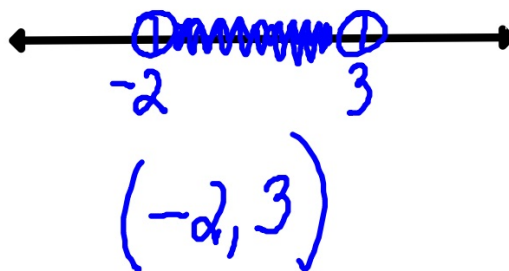
$$\begin{array}{r} 2x-1 > -5 \\ +1 \quad +1 \\ \hline \end{array}$$

$$2x > -4$$

$$x > -2$$

★ first inequality
keep the sign

★ second inequality
flip the sign + make
answer negative



example 5:

$$|2x+4| \geq 6$$

$$\begin{array}{r} 2x+4 \geq 6 \\ -4 \quad -4 \end{array}$$

$$\underline{2x \geq 2}$$

$$x \geq 1$$

$$\begin{array}{r} 2x+4 \leq -6 \\ -4 \quad -4 \end{array}$$

$$\underline{2x \leq -10}$$

$$x \leq -5$$

$$(-\infty, -5] \cup [1, \infty)$$



example 6:

$$\frac{-2|3x-4| \geq -12}{\cancel{x2}}$$

$$|3x-4| \leq 6$$

$$\begin{array}{r} 3x-4 \leq 6 \\ +4 \quad +4 \\ \hline 3x \leq 10 \\ \boxed{x \leq \frac{10}{3}} \end{array}$$

$$\begin{array}{r} 3x-4 \geq -6 \\ +4 \quad +4 \\ \hline 3x \geq -2 \\ \boxed{x \geq -\frac{2}{3}} \end{array}$$



$$\left[-\frac{2}{3}, \frac{10}{3}\right]$$

Special Cases:

example 8:

$$|2x+5| < -6 \quad \text{or}$$

pos. < neg.

NO SOLUTION

\emptyset

example 9:

$$|2x+5| > -6$$

pos. > neg

$(-\infty, \infty)$

Homework: 10/16/12

Pg. 46 #13-#18
#25-#30